

November 15, 2005

Peter Van Alyea  
Redwood Oil Company  
455 Yolanda Avenue, Suite 200  
Santa Rosa, CA 95404

Ground Water Monitoring Report  
October 2005  
Redwood Oil Service Station #101  
4925 Sonoma Highway  
Santa Rosa, California  
ECM Project # 98-517-14

Dear Mr. Van Alyea:

This report provides the results of semi-annual ground water monitoring at 4925 Sonoma Highway, Santa Rosa, California (Figure 1, Appendix A). On October 14, 2005, ECM personnel visited the site. Ground water elevations were measured and ground water samples were collected from the two monitoring wells (MW-2 and MW-3). The well locations are shown on Figure 2 (Appendix A).

Ground water levels were measured in the two monitoring wells. Free-phase hydrocarbons were not observed in any of the wells. Wellheads and well vaults were observed to be in good condition. Water level data is shown in Table 1 (Appendix B) and a ground water elevation map is included as Figure 2 (Appendix A).

Ground water samples were forwarded under chain of custody record to Entech Analytical Labs, Inc., of Santa Clara, California for analysis. Analytical results for ground water are included in Table 2 (Appendix B). Ground water samples were collected in accordance with ECM Standard Operating Procedure - Ground Water Sampling (Appendix E).

The chain of custody document and laboratory analytical reports are included as Appendix C. The water sampling data sheets are included as Appendix D. Purge water and decon rinseate were transported to an ROC holding tank for proper disposal.

Analytical results for ground water samples collected during this event were consistent with results from prior events for monitoring wells MW-2 and MW-3. Low to moderate concentrations of gasoline and BTEX compounds were detected in the samples from MW-2 and MW-3. A low concentration of MTBE was also detected in the sample from well MW-3.

Contaminant concentrations in samples from MW-3 have fluctuated between high and low. No correlation between contamination concentration and ground water elevation is apparent.

Peter Van Alyea  
ECM Project #98-517-14

Page 2 of 2

Thank you for the opportunity to provide environmental services to you. Please call if you have any questions.

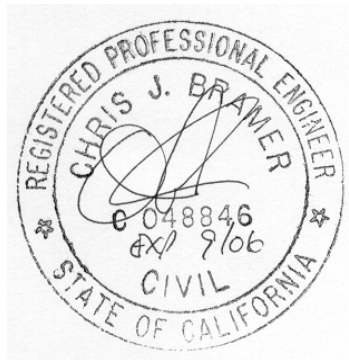
Sincerely,  
ECM Group



David Hazard  
Environmental Scientist



Chris Bramer  
Professional Engineer #C048846



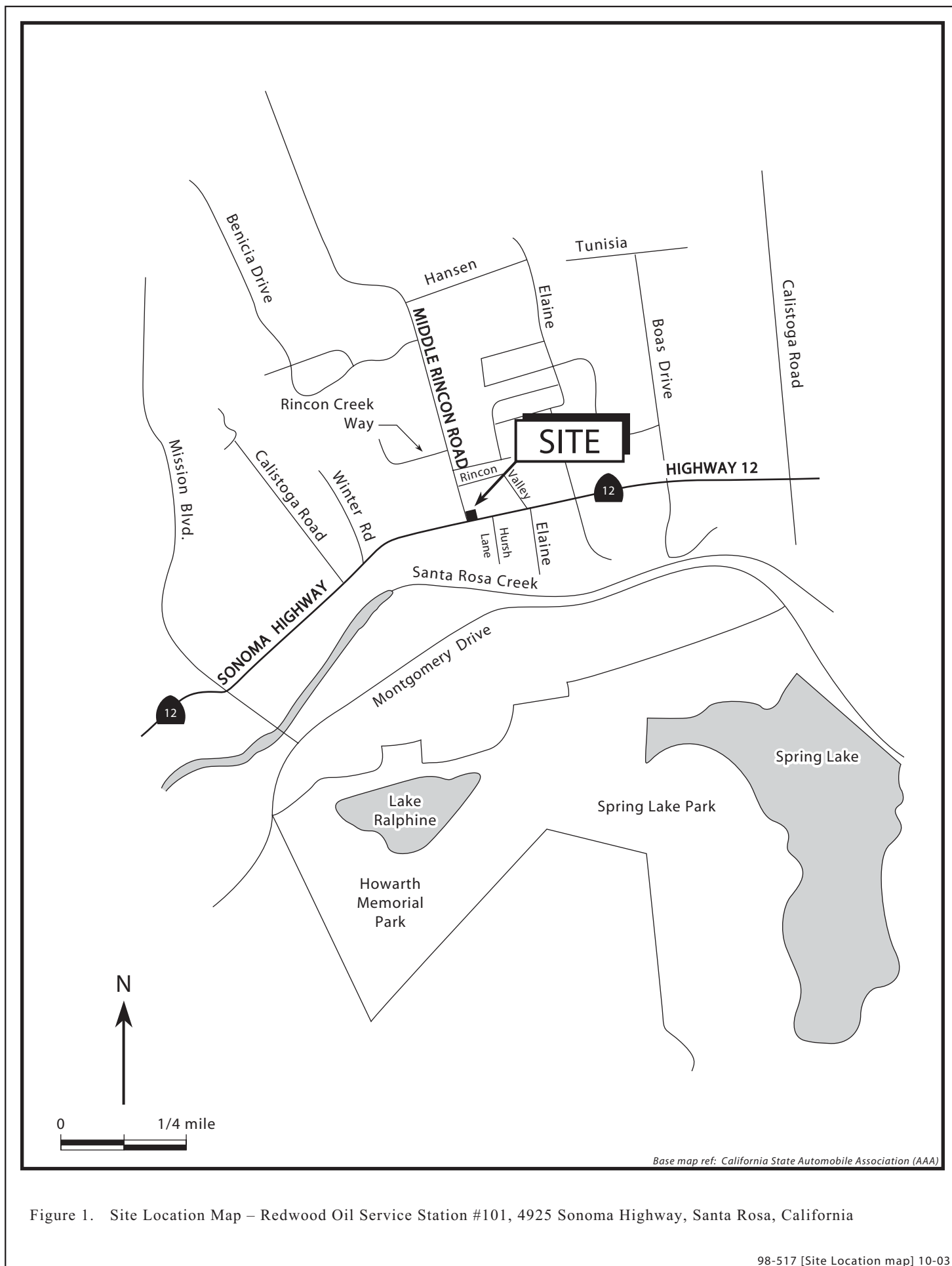
Appendices:

- A - Figures
- B - Tables
- C - Chain of Custody and Laboratory Analytical Reports
- D - Water Sampling Data Sheets
- E - Standard Operating Procedure

cc: Jo Bentz, North Coast Regional Water Quality Control Board

## **APPENDIX A**

### **FIGURES**



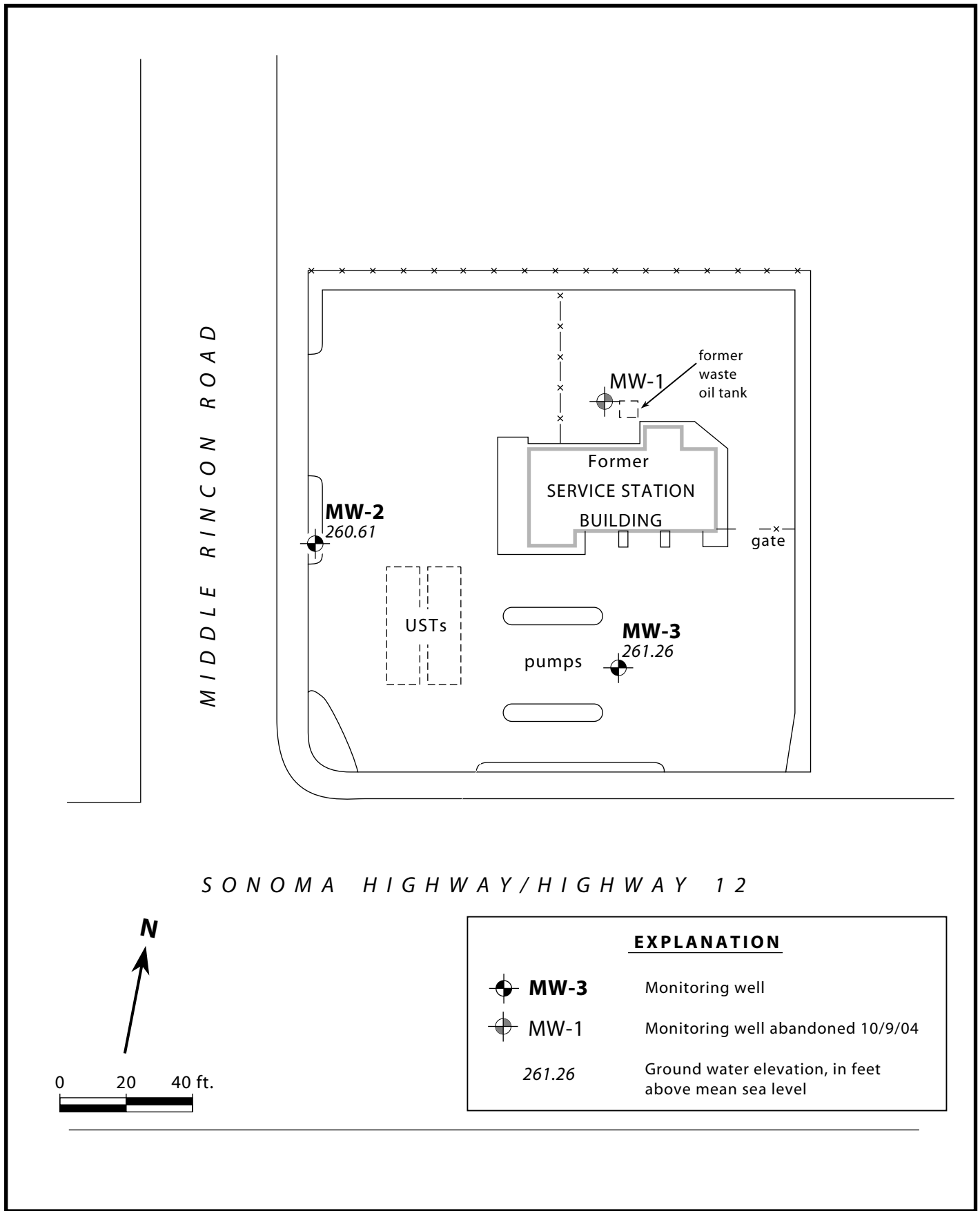


Figure 2. □ Monitoring Well Locations and Ground Water Elevation Map - October 14, 2005 - Redwood Oil Service Station #101, 4925 Sonoma Highway, Santa Rosa, California

## **APPENDIX B**

### **TABLES**

Table 1. Water Level Data and Well Construction Details - Redwood Oil Service Station #101, 4925 Sonoma Highway, Santa Rosa, California

Well ID	Sample Date	DTW (Ft)	TOC (Ft, msl)	GWE (Ft, msl)	Screen Interval	Sand Pack Interval	Bentonite Grout Interval	Notes
MW-1	01/30/92	26.20	275.92	249.72	23 - 37	21 - 37	0 - 21	
	04/27/92	23.75		252.17				
	07/31/92	---		---				Monitoring well was inaccessible.
	10/27/92	---		---				Monitoring well was inaccessible.
	02/03/93	---		---				Monitoring well was inaccessible.
	04/28/93	---		---				Monitoring well was inaccessible.
	01/07/94	24.32		251.60				
	04/05/94	23.14		252.78				
	07/21/94	26.11		249.81				
	10/06/94	27.76		248.16				
	04/26/95	20.57		255.35				
	07/06/95	22.37		253.55				
	10/12/95	26.52		249.40				
	01/11/96	23.51		252.41				
	04/03/96	20.10		255.82				
	07/30/96	23.10		252.82				
	10/02/96	23.46		252.46				
	01/24/97	16.81		259.11				
	04/03/97	20.29		255.63				
	07/10/97	22.91		253.01				
	10/30/97	24.38		251.54				
	01/13/98	21.05		254.87				
	05/06/98	---		---				Monitoring well was inaccessible.
	07/01/98	20.46		255.46				
	10/05/98	24.30		251.62				
	04/05/99	16.61		259.31				
	10/07/99	25.48		250.44				
	04/17/00	19.20		256.72				
	10/24/00	26.28	275.93	249.65				Data from November 27, 2000 Earth Engineers report.
	05/25/01	---		---				Monitoring well was inaccessible.
	08/28/01	25.80		250.13				
	10/09/01	26.37		249.56				
	04/11/02	20.88	278.94	258.06				Resurveyed on December 8, 2001
	10/09/02	25.52		253.42				
	04/02/03	20.32		258.62				

Table 1. Water Level Data and Well Construction Details - Redwood Oil Service Station #101, 4925 Sonoma Highway, Santa Rosa, California

Well ID	Sample Date	DTW (Ft)	TOC (Ft, msl)	GWE (Ft, msl)	Screen Interval	Sand Pack Interval	Bentonite Grout Interval	Notes
MW-1	10/15/03	24.86	278.94	254.08	23 - 37	21 - 37	0 - 21	
	01/05/04	19.56		259.38				
	04/22/04	20.41		258.53				
	10/06/04	24.94		254.00				Well Abandoned 10/9/04.
MW-2	01/30/92	22.32	274.29	251.97	18 - 33	16 - 33	0 - 16	
	04/27/92	18.68		255.61				
	07/31/92	23.29		251.00				
	10/28/92	27.27		247.02				
	02/03/93	17.87		256.42				
	04/28/93	23.12		251.17				
	01/07/94	20.07		254.22				
	04/05/94	19.33		254.96				
	07/21/94	22.21		252.08				
	10/06/94	24.41		249.88				
	04/26/95	18.89		255.40				
	07/06/95	18.76		255.53				
	10/12/95	23.33		250.96				
	01/11/96	19.59		254.70				
	04/03/96	16.02		258.27				
	07/30/96	18.63		255.66				
	10/02/96	20.91		253.38				
	01/24/97	14.48		259.81				
	04/03/97	17.54		256.75				
	07/10/97	19.61		254.68				
	10/30/97	21.47		252.82				
	01/13/98	16.82		257.47				
	05/06/98	15.21		259.08				
	07/01/98	17.15		257.14				
	10/05/98	21.49		252.80				
	04/05/99	16.20		258.09				
	10/07/99	22.67		251.62				
	04/17/00	17.51		256.78				
	10/24/00	23.90	274.28	250.38				Data from November 27, 2000 Earth Engineers report.
	05/25/01	20.25		254.03				



Table 1. Water Level Data and Well Construction Details - Redwood Oil Service Station #101, 4925 Sonoma Highway, Santa Rosa, California

Well ID	Sample Date	DTW (Ft)	TOC (Ft, msl)	GWE (Ft, msl)	Screen Interval	Sand Pack Interval	Bentonite Grout Interval	Notes
<b>MW-2</b>	08/28/01	22.17	274.28	252.11	18 - 33	16 - 33	0 - 16	
	10/09/01	26.10		248.18				
	04/11/02	17.25	277.31	260.06				Resurveyed on December 8, 2001
	10/09/02	23.30		254.01				
	04/02/03	14.75		262.56				
	10/15/03	26.79		250.52				
	01/05/04	15.37		261.94				
	04/22/04	17.19		260.12				
	10/06/04	23.52		253.79				
	04/19/05	19.93		257.38				
	<b>10/14/05</b>	<b>16.70</b>		<b>260.61</b>				
<b>MW-3</b>	01/30/92	29.06	278.62	249.56	25 - 40	23 - 40	0 - 23	
	04/27/92	24.78		253.84				
	07/31/92	29.18		249.44				
	10/28/92	30.90		247.72				
	02/03/93	24.77		253.85				
	04/28/93	17.62		261.00				
	01/07/94	25.85		252.77				
	04/05/94	24.20		254.42				
	07/21/94	25.81		252.81				
	10/06/94	29.86		248.76				
	04/26/95	20.37		258.25				
	07/06/95	22.41		256.21				
	10/12/95	27.92		250.70				
	01/11/96	26.06		252.56				
	04/03/96	22.11		256.51				
	07/30/96	24.44		254.18				
	10/02/96	24.14		254.48				
	01/24/97	21.46		257.16				
	04/03/97	21.09		257.53				
	07/10/97	23.31		255.31				
	10/30/97	24.62		254.00				
	01/13/98	25.00		253.62				
	05/06/98	20.30		258.32				

Table 1. Water Level Data and Well Construction Details - Redwood Oil Service Station #101, 4925 Sonoma Highway, Santa Rosa, California

Well ID	Sample Date	DTW (Ft)	TOC (Ft, msl)	GWE (Ft, msl)	Screen Interval	Sand Pack Interval	Bentonite Grout Interval	Notes
<b>MW-3</b>	07/01/98	21.24	278.62	257.38	25 - 40	23 - 40	0 - 23	
	10/05/98	24.82		253.80				
	04/05/99	19.97		258.65				
	10/07/99	27.41		251.21				
	04/17/00	22.60		256.02				
	10/24/00	29.14		249.48				Data from November 27, 2000 Earth Engineers report.
	05/25/01	24.42		254.20				
	08/28/01	27.61		251.01				
	10/09/01	28.97		249.65				
	04/11/02	25.63	281.65	256.02				Monitoring well re-surveyed on December 8, 2001
	10/09/02	27.35		254.30				
	04/02/03	24.00		257.65				
	10/15/03	22.25		259.40				
	01/05/04	22.47		259.18				
	04/22/04	20.23		261.42				
	10/06/04	26.04		255.61				
	04/19/05	19.73		261.92				
	<b>10/14/05</b>	<b>20.39</b>		<b>261.26</b>				

**EXPLANATION:**

DTW = Depth to Water

TOC = Top of Casing

GWE = Ground Water Elevation

msl = Measurement referenced relative to mean sea level

Top of casing elevations were surveyed by Ron Miller, Registered Engineer #15816, on February 12, 1992.

Top of casing elevations were re-surveyed by Bradley Thomas, PLS, Windsor Engineering & Land Surveying on June 19, 2000.

Table 2. Analytical Results for Groundwater - Redwood Oil Service Station #101 - 4925 Sonoma Highway, Santa Rosa, California

Sample ID	Date Sampled	TPPH (G)/ TPH(G)	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE	N	Notes
		<----- ppb ----->							
MW-1	01/30/92	<50	1.2	0.6	0.5	0.7	---	---	
	01/30/92	---	5	<5.0	<5.0	10	---	3,800	Sample analyzed for VOCs and Or Pb. Neither was detected. See lab report for detection limits.
	04/27/92	<50	<0.5	<0.5	<0.5	<0.5	---	5,800	
	07/31/92	---	---	---	---	---	---	---	Monitoring well was inaccessible.
	10/27/92	---	---	---	---	---	---	---	Monitoring well was inaccessible.
	02/03/93	---	---	---	---	---	---	---	Monitoring well was inaccessible.
	04/28/93	---	---	---	---	---	---	---	Monitoring well was inaccessible.
	01/07/94	<50	1	1.2	<0.5	0.7	---	6,600	
	07/21/94	<50	<0.5	<0.5	<0.5	<0.5	---	7,200	
	04/26/95	<50	<0.5	<0.5	<0.5	<0.5	---	5,700	
	10/12/95	97	0.7	0.6	<0.5	0.6	---	---	
	04/03/96	90	6	17	3	16	---	30,000	
	10/02/96	<50	<0.5	0.6	<0.5	0.8	<5.0	12,000	
	04/03/97	<50	<0.5	<0.5	<0.5	<0.5	<5.0	7,900	
	10/30/97	<50	<0.5	<0.5	<0.5	<0.5	<5.0	9,800	
	05/06/98	---	---	---	---	---	---	---	Monitoring well was inaccessible.
	10/05/98	<50	<0.5	<0.5	<0.5	<1.0	<1.03	---	
	04/05/99	<50	<0.5	<0.5	<0.5	<0.5	<5.0	---	
	10/07/99	<50	2.5	<0.5	<0.5	0.7	<0.5	---	
	04/17/00	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	
	10/24/00	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	This sampling event was performed by Earth Engineers. Data taken from November 27, 2000 Earth Engineers report.
	05/25/01	---	---	---	---	---	---	---	Monitoring well was inaccessible.
	08/28/01	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	Sample analyzed for diesel by EPA Method 8015. The result was 130 ppb.
	10/09/01	58	4.9	4.5	1.7	6.8	<5	---	
	04/11/02	110	10	7.8	2.4	18.8	<5	---	
	10/09/02	66	4.2	3.3	1.6	5	<5	---	
	04/02/03	<50	<0.5	<0.5	<0.5	<1	<1	---	
	10/15/03	<50	<0.5	<0.5	<0.5	<1	1.13	---	
	01/05/04	71	8.5	7.9	1.7	6.4	<1	---	
	04/22/04	190	11	26	3.2	36	13	---	
	10/06/04	<25	<0.5	<0.5	<0.5	<1	<1		

Table 2. Analytical Results for Groundwater - Redwood Oil Service Station #101 - 4925 Sonoma Highway, Santa Rosa, California

Sample ID	Date Sampled	TPPH (G)/ TPH(G)	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE	N	Notes
		<----- ppb ----->							
MW-2	01/30/92	8,800	2,900	3.5	21	24	---	<30	Sample analyzed for VOCs and Or Pb. Neither was detected. See lab report for detection limits
	04/27/92	12,000	410	28	79	21	--	---	
	07/31/92	16,000	4,500	<25	33	49	---	---	
	10/27/92	15,000	7,100	<5.0	26	25	---	---	
	02/03/93	3,100	930	<5.0	18	9.4	---	---	
	04/28/93	7,600	4,200	82	73	80	---	---	
	01/07/94	19,000	7,300	76	220	140	---	<30	
	07/21/94	9,000	1,800	55	130	100	---	<30	
	04/26/95	9,700	4,500	64	130	86	---	<30	
	10/12/95	27,000	6,100	290	680	930	---	---	
	01/30/92	8,800	2,900	3.5	21	24	---	<30	Sample analyzed for VOCs and Or Pb. Neither was detected. See lab report for detection limits
	04/27/92	12,000	410	28	79	21	--	---	
	07/31/92	16,000	4,500	<25	33	49	---	---	
	10/27/92	15,000	7,100	<5.0	26	25	---	---	
	02/03/93	3,100	930	<5.0	18	9.4	---	---	
	04/28/93	7,600	4,200	82	73	80	---	---	
	01/07/94	19,000	7,300	76	220	140	---	<30	
	07/21/94	9,000	1,800	55	130	100	---	<30	
	04/26/95	9,700	4,500	64	130	86	---	<30	
	10/12/95	27,000	6,100	290	680	930	---	---	
	04/03/96	16,000	5,800	150	400	430	---	62	
	10/02/96	20,000	4,900	310	590	600	1,600	30	
	04/03/97	3,100	570	23	83	52	790	49	
	10/30/97	12,000	2,700	98	530	330	1,000	150	
	05/06/98	9,900	1,900	28	280	130	880	<100	
	10/05/98	6,100	98	89	<5.0	96	6203	---	
	04/05/99	220	42	<0.5	11	0.78	24	---	
	10/07/99	3,300	600	15	52	17	870	---	
	04/17/00	4,500	26	46	<0.5	1.8	180	---	
	10/24/00	480	4.4	<0.5	<0.5	<0.5	130	---	Sampling performed by Earth Engineers. Data taken from November 27, 2000 Earth Engineers report. Well was not purged prior to sample

Table 2. Analytical Results for Groundwater - Redwood Oil Service Station #101 - 4925 Sonoma Highway, Santa Rosa, California

Sample ID	Date Sampled	TPPH (G)/ TPH(G)	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE	N	Notes
		<----- ppb ----->							
MW-2	10/24/00	14,000	1,900	48	480	88	680	---	Sampling performed by Earth Engineers. Data taken from November 27, 2000 Earth Engineers report.
	05/25/01	980	82	1	22	13	130	---	
	10/09/01	4,400	630	18	23	53	6.5	---	
	04/11/02	120	8.4	6.9	3.1	19.8	18	---	
	10/09/02	50	6.6	5.6	2.8	9.2	<5	---	
	04/02/03	<50	<0.5	<0.5	<0.5	<1	2.7	---	
	10/15/03	<50	<0.5	<0.5	<0.5	<1	9.6	---	
	01/05/04	84	9.2	9	1.8	7.6	<1	---	
	04/22/04	350	19	46	5.7	69	11	---	
	10/06/04	<25	<0.5	<0.5	<0.5	<1	<1		
	04/19/05	<50	<0.5	<0.5	<0.5	<0.5	<1	---	
	10/14/05	240	17	4.0	1.5	73	<1.0	---	
MW-3	01/30/92	260	4.8	<0.5	<0.5	0.7	---	160	Sample analyzed for VOCs and Or Pb. Neither was detected. See lab report for detection limits
	04/27/92	3,400	220	<0.5	<0.5	8.2	---	270	
	07/31/92	6,500	340	<5.0	<5.0	<5.0	---	---	
	10/28/92	9,900	490	5.1	26	21	---	---	
	02/03/93	3,800	380	27	3.3	9.5	---	---	
	04/28/93	3,200	160	<0.5	<0.5	7	---	---	
	01/07/94	7,800	350	13	13	16	---	200	
	07/21/94	5,100	21	<5.0	<5.0	<5.0	--	<30	
	04/26/95	2,600	280	2.4	<0.5	4.6	---	50	
	10/12/95	2,600	210	9.1	3.2	4.1	---	----	
	04/03/96	2,300	200	24	29	38	---	470	
	10/02/96	5,600	94	1.2	2.8	3.8	<5.0	<30	
	04/03/97	1,900	36	8.2	2.1	10	28	63	
	10/30/97	3,900	54	<2.5	<2.5	<2.5	<25	130	
	05/06/98	3,200	56	<0.5	<0.5	<0.5	5	<100	
	10/05/98	3,700	28	<0.5	<0.5	<1.0	8	---	
	04/05/99	1,900	43	2.2	5	3.3	68	---	
	10/07/99	3,900	65	40	0.6	4.1	120	---	
	04/17/00	4,200	460	19	230	39	400	---	

Table 2. Analytical Results for Groundwater - Redwood Oil Service Station #101 - 4925 Sonoma Highway, Santa Rosa, California

Sample ID	Date Sampled	TPPH (G)/ TPH(G)	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE	N	Notes
		<----- ppb ----->							
MW-3	10/24/00	5,100	14	<0.5	<0.5	<0.5	12	---	Sampling performed by Earth Engineers. Data taken from November 27, 2000 Earth Engineers report. Well was not purged prior to sample.
	10/24/00	4,600	13	<0.5	<0.5	<0.5	11	---	Sampling performed by Earth Engineers. Data taken from November 27, 2000 Earth Engineers report.
	05/25/01	2,600	10	3.5	<0.5	1.8	8.2	---	
	10/09/01	1,300	39	6.3	3	7.2	<5	---	
	04/11/02	280	11	8.1	2.5	18.6	<5	---	
	10/09/02	55	4.7	3.7	1.8	5.8	<5	---	
	04/02/03	68	<0.5	<0.5	<0.5	<1	<1	---	
	10/15/03	830	9.2	<1	<1	<2	1.3	---	
	01/05/04	1,000	13	25	7.6	24	<1	---	
	04/22/04	1,100	10	20	2.6	28	10	---	
	10/06/04	60	<0.5	<0.5	<0.5	<1	<1		
	04/19/05	81	<0.5	<0.5	<0.5	<0.5	<1	---	
	10/14/05	220	5.6	5.1	1.8	8.7	1.1	---	
Orchard	10/24/00	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	
DW-62MRR	12/03/01	<50	<0.5	<0.5	<0.5	<0.5	<5	—	
DW Rincon feed	10/24/00	<50	<0.5	<0.5	<0.5	<0.5	<0.5	---	
	12/03/01	<50	<0.5	<0.5	<0.5	<0.5	<5	---	

**EXPLANATION:**

TPH(G) = Total Petroleum Hydrocarbons as Gasoline

MTBE = Methyl t-butyl ether

N = Nitrate as N

VOC = Volatile organic compound

OL= Organic Lead

DW-62 MRR = Domestic well located at 62 Middle Rincon Road, approximately 150 ft north of the site.

DW-Rincon feed = Water supply well located at Carter's Rincon Valley Feeds. Well is located approximately 100 ft west and 100 ft north of the site.

"Orchard well" is located approximately 325 ft west and 150 ft north of the site. It serves two residences located on Sonoma Highway.

## **APPENDIX C**

### **CHAIN OF CUSTODY AND LABORATORY ANALYTICAL REPORT**

# Entech Analytical Labs, Inc.

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3334 Victor Court • Santa Clara, CA 95054 • (408) 588-0200 • Fax (408) 588-0201

Jim Green  
ECM Group  
290 W. Channel Rd.  
Benicia, CA 94510

Lab Certificate Number: 45824  
Issued: 10/25/2005

Project Number: 98-517-14  
Project Name: Sonoma Highway

Global ID: T0609700640

## Certificate of Analysis - Final Report

On October 17, 2005, samples were received under chain of custody for analysis.  
Entech analyzes samples "as received" unless otherwise noted. The following results are included:

<u>Matrix</u>	<u>Test</u>	<u>Comments</u>
Liquid	EDF EPA 8260B EPA 624 TPH as Gasoline - GC-MS	

Entech Analytical Labs, Inc. is certified for environmental analyses by the State of California (#2346).  
If you have any questions regarding this report, please call us at 408-588-0200 ext. 225.

Sincerely,



Laurie Glantz-Murphy  
Laboratory Director



# Entech Analytical Labs, Inc.

3334 Victor Court , Santa Clara, CA 95054

Phone: (408) 588-0200

Fax: (408) 588-0201

ECM Group  
290 W. Channel Rd.  
Benicia, CA 94510  
Attn: Jim Green

Date Received: 10/17/2005 12:29:41 PM

Project Number: 98-517-14  
Project Name: Sonoma Highway  
GlobalID: T0609700640

## Certificate of Analysis - Data Report

Sample Collected by: Client

Lab # : 45824-001 Sample ID: MW-2

Matrix: Liquid Sample Date: 10/14/2005 10:35 AM

EPA 5030C EPA 8260B EPA 624										8260Petroleum
Parameter	Result	Qual	D/P-F	Detection Limit	Units	Prep Date	Prep Batch	Analysis Date	QC Batch	
Benzene	17		1.0	0.50	µg/L	N/A	N/A	10/21/2005	WM2051020	
Toluene	4.0		1.0	0.50	µg/L	N/A	N/A	10/21/2005	WM2051020	
Ethyl Benzene	1.5		1.0	0.50	µg/L	N/A	N/A	10/21/2005	WM2051020	
Xylenes, Total	73		1.0	0.50	µg/L	N/A	N/A	10/21/2005	WM2051020	
Methyl-t-butyl Ether	ND		1.0	1.0	µg/L	N/A	N/A	10/21/2005	WM2051020	
tert-Butyl Ethyl Ether	ND		1.0	5.0	µg/L	N/A	N/A	10/21/2005	WM2051020	
tert-Butanol (TBA)	ND		1.0	10	µg/L	N/A	N/A	10/21/2005	WM2051020	
Diisopropyl Ether	ND		1.0	5.0	µg/L	N/A	N/A	10/21/2005	WM2051020	
tert-Amyl Methyl Ether	ND		1.0	5.0	µg/L	N/A	N/A	10/21/2005	WM2051020	

Surrogate	Surrogate Recovery	Control Limits (%)	
4-Bromofluorobenzene	91.2	70	- 130
Dibromofluoromethane	93.8	70	- 130
Toluene-d8	95.7	70	- 130

Analyzed by: TAF

Reviewed by: MaiChiTu

EPA 5030C GC-MS								TPH as Gasoline - GC-MS	
Parameter	Result	Qual	D/P-F	Detection Limit	Units	Prep Date	Prep Batch	Analysis Date	QC Batch
TPH as Gasoline	240		1.0	50	µg/L	N/A	N/A	10/21/2005	WM2051020
Surrogate	Surrogate Recovery	Control Limits (%)						Analyzed by: TAF	
4-Bromofluorobenzene	100	70 - 130						Reviewed by: MaiChiTu	
Dibromofluoromethane	104	70 - 130							
Toluene-d8	98.5	70 - 130							

Analyzed by: TAF

Reviewed by: MaiChiTu

# Entech Analytical Labs, Inc.

3334 Victor Court , Santa Clara, CA 95054

Phone: (408) 588-0200

Fax: (408) 588-0201

ECM Group  
290 W. Channel Rd.  
Benicia, CA 94510  
Attn: Jim Green

Date Received: 10/17/2005 12:29:41 PM

Project Number: 98-517-14  
Project Name: Sonoma Highway  
GlobalID: T0609700640

## Certificate of Analysis - Data Report

Sample Collected by: Client

Lab #: 45824-002 Sample ID: MW-3

Matrix: Liquid Sample Date: 10/14/2005 10:15 AM

EPA 5030C EPA 8260B EPA 624			8260Petroleum							
Parameter	Result	Qual	D/P-F	Detection Limit	Units	Prep Date	Prep Batch	Analysis Date	QC Batch	
Benzene	5.6		1.0	0.50	µg/L	N/A	N/A	10/21/2005	WM2051020	
Toluene	5.1		1.0	0.50	µg/L	N/A	N/A	10/21/2005	WM2051020	
Ethyl Benzene	1.8		1.0	0.50	µg/L	N/A	N/A	10/21/2005	WM2051020	
Xylenes, Total	8.7		1.0	0.50	µg/L	N/A	N/A	10/21/2005	WM2051020	
Methyl-t-butyl Ether	1.1		1.0	1.0	µg/L	N/A	N/A	10/21/2005	WM2051020	
tert-Butyl Ethyl Ether	ND		1.0	5.0	µg/L	N/A	N/A	10/21/2005	WM2051020	
tert-Butanol (TBA)	ND		1.0	10	µg/L	N/A	N/A	10/21/2005	WM2051020	
Diisopropyl Ether	ND		1.0	5.0	µg/L	N/A	N/A	10/21/2005	WM2051020	
tert-Amyl Methyl Ether	ND		1.0	5.0	µg/L	N/A	N/A	10/21/2005	WM2051020	

Surrogate	Surrogate Recovery	Control Limits (%)	
4-Bromofluorobenzene	90.5	70	- 130
Dibromofluoromethane	93.5	70	- 130
Toluene-d8	96.3	70	- 130

Analyzed by: TAF

Reviewed by: MaiChiTu

EPA 5030C GC-MS								TPH as Gasoline - GC-MS	
Parameter	Result	Qual	D/P-F	Detection Limit	Units	Prep Date	Prep Batch	Analysis Date	QC Batch
TPH as Gasoline	220		1.0	50	µg/L	N/A	N/A	10/21/2005	WM2051020
Surrogate	Surrogate Recovery		Control Limits (%)					Analyzed by: TAF	
4-Bromofluorobenzene	99.3		70	-	130			Reviewed by: MaiChiTu	
Dibromofluoromethane	104		70	-	130				
Toluene-d8	99.2		70	-	130				

Analyzed by: TAF

Reviewed by: MaiChiTu

# Entech Analytical Labs, Inc.

3334 Victor Court , Santa Clara, CA 95054

Phone: (408) 588-0200

Fax: (408) 588-0201

Method Blank - Liquid - EPA 8260B - 8260Petroleum

QC Batch ID: WM2051020

Validated by: MaiChiTu - 10/24/05

QC Batch Analysis Date: 10/20/2005

Parameter	Result	DF	PQLR	Units
Benzene	ND	1	0.50	µg/L
Diisopropyl Ether	ND	1	5.0	µg/L
Ethyl Benzene	ND	1	0.50	µg/L
Methyl-t-butyl Ether	ND	1	1.0	µg/L
tert-Amyl Methyl Ether	ND	1	5.0	µg/L
tert-Butanol (TBA)	ND	1	10	µg/L
tert-Butyl Ethyl Ether	ND	1	5.0	µg/L
Toluene	ND	1	0.50	µg/L
Xylenes, Total	ND	1	0.50	µg/L

Surrogate for Blank    % Recovery    Control Limits

4-Bromofluorobenzene    **90.3**    70 - 130

Dibromofluoromethane    **90.4**    70 - 130

Toluene-d8    **97.3**    70 - 130

Method Blank - Liquid - GC-MS - TPH as Gasoline - GC-MS

QC Batch ID: WM2051020

Validated by: MaiChiTu - 10/24/05

QC Batch Analysis Date: 10/20/2005

Parameter	Result	DF	PQLR	Units
TPH as Gasoline	ND	1	50	µg/L

Surrogate for Blank    % Recovery    Control Limits

4-Bromofluorobenzene    **99.1**    70 - 130

Dibromofluoromethane    **100**    70 - 130

Toluene-d8    **100**    70 - 130

# Entech Analytical Labs, Inc.

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Phone: (408) 588-0200

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Laboratory Control Sample / Duplicate - Liquid - EPA 8260B - 8260Petroleum

QC Batch ID: WM2051020

Reviewed by: MaiChiTu - 10/24/05

QC Batch ID Analysis Date: 10/20/2005

## LCS

Parameter	Method Blank	Spike Amt	SpikeResult	Units	% Recovery	Recovery Limits
1,1-Dichloroethene	<0.50	20	21.3	µg/L	107	70 - 130
Benzene	<0.50	20	19.3	µg/L	96.7	70 - 130
Chlorobenzene	<0.50	20	22.2	µg/L	111	70 - 130
Methyl-t-butyl Ether	<1.0	20	17.1	µg/L	85.7	70 - 130
Toluene	<0.50	20	19.5	µg/L	97.7	70 - 130
Trichloroethene	<0.50	20	22.2	µg/L	111	70 - 130

Surrogate	% Recovery	Control Limits
4-Bromofluorobenzene	90.2	70 - 130
Dibromofluoromethane	92.4	70 - 130
Toluene-d8	95.5	70 - 130

## LCSD

Parameter	Method Blank	Spike Amt	SpikeResult	Units	% Recovery	RPD	RPD Limits	Recovery Limits
1,1-Dichloroethene	<0.50	20	20.0	µg/L	100	6.4	25.0	70 - 130
Benzene	<0.50	20	18.5	µg/L	92.6	4.3	25.0	70 - 130
Chlorobenzene	<0.50	20	21.4	µg/L	107	3.8	25.0	70 - 130
Methyl-t-butyl Ether	<1.0	20	16.4	µg/L	82.1	4.2	25.0	70 - 130
Toluene	<0.50	20	18.8	µg/L	93.8	4.1	25.0	70 - 130
Trichloroethene	<0.50	20	21.1	µg/L	106	5.0	25.0	70 - 130

Surrogate	% Recovery	Control Limits
4-Bromofluorobenzene	90.5	70 - 130
Dibromofluoromethane	91.3	70 - 130
Toluene-d8	95.7	70 - 130

Laboratory Control Sample / Duplicate - Liquid - GC-MS - TPH as Gasoline - GC-MS

QC Batch ID: WM2051020

Reviewed by: MaiChiTu - 10/24/05

QC Batch ID Analysis Date: 10/20/2005

## LCS

Parameter	Method Blank	Spike Amt	SpikeResult	Units	% Recovery	Recovery Limits
TPH as Gasoline	<25	250	270	µg/L	108	65 - 135

Surrogate	% Recovery	Control Limits
4-Bromofluorobenzene	101	70 - 130
Dibromofluoromethane	102	70 - 130
Toluene-d8	100	70 - 130

## LCSD

Parameter	Method Blank	Spike Amt	SpikeResult	Units	% Recovery	RPD	RPD Limits	Recovery Limits
TPH as Gasoline	<25	250	272	µg/L	109	0.79	25.0	65 - 135

Surrogate	% Recovery	Control Limits
4-Bromofluorobenzene	102	70 - 130
Dibromofluoromethane	102	70 - 130
Toluene-d8	101	70 - 130

# Entech Analytical Labs, Inc.

3334 Victor Court , Santa Clara, CA 95054

Phone: (408) 588-0200

Fax: (408) 588-0201

Matrix Spike / Matrix Spike Duplicate - Liquid - EPA 8260B - 8260Petroleum

QC Batch ID: WM2051020

Reviewed by: MaiChiTu - 10/24/05

QC Batch ID Analysis Date: 10/20/2005

MS Sample Spiked: 45824-002

Parameter	Sample Result	Spike Amount	Spike Result	Units	Analysis Date	% Recovery	Recovery Limits
Benzene	5.63	20	25.0	µg/L	10/20/2005	96.6	70 - 130
Methyl-t-butyl Ether	1.14	20	19.0	µg/L	10/20/2005	89.3	70 - 130
Toluene	5.12	20	23.9	µg/L	10/20/2005	94.1	70 - 130

Surrogate	% Recovery	Control Limits
4-Bromofluorobenzene	90.1	70 - 130
Dibromofluoromethane	97.6	70 - 130
Toluene-d8	94.4	70 - 130

MSD Sample Spiked: 45824-002

Parameter	Sample Result	Spike Amount	Spike Result	Units	Analysis Date	% Recovery	RPD	RPD Limits	Recovery Limits
Benzene	5.63	20	24.1	µg/L	10/20/2005	92.2	4.6	25.0	70 - 130
Methyl-t-butyl Ether	1.14	20	19.0	µg/L	10/20/2005	89.2	0.15	25.0	70 - 130
Toluene	5.12	20	23.6	µg/L	10/20/2005	92.6	1.6	25.0	70 - 130

Surrogate	% Recovery	Control Limits
4-Bromofluorobenzene	89.7	70 - 130
Dibromofluoromethane	97.3	70 - 130
Toluene-d8	94.8	70 - 130

# Entech Analytical Labs, Inc.

**3334 Victor Court**  
**(408) 588-0200**

**Santa Clara, CA 95054 (408) 588-0201 - Fax**

## Chain of Custody / Analysis Request

[illegible]

**APPENDIX D**

**WATER SAMPLING DATA SHEETS**

### ECM group

DATE: 10/11/05

BY: MST[illegible]



# WATER SAMPLING DATA

Job Name SOMOMA HIGHWAY Job Number 98-517-14  
 Well Number MW-2 Date 10/11/05 Time \_\_\_\_\_  
 Well Diameter 2" Well Depth (spec.) \_\_\_\_\_ Well Depth (sounded) 30.35  
 Depth to Water (static) 16.70 TOC elev. \_\_\_\_\_  
 G.W. Elev. \_\_\_\_\_ Maximum Drawdown Limit (if applicable) \_\_\_\_\_

## Formula/Conversions

$r$  = well radius in ft  
 $h$  = ht of water col. in ft  
 $vol.$  in cyl. =  $\pi r^2 h$   
 $7.48 \text{ gal/ft}^3$   
 $V_1$  casing =  $0.163 \text{ gal/ft}$   
 $V_2$  casing =  $0.167 \text{ gal/ft}$   
 $V_3$  casing =  $0.163 \text{ gal/ft}$   
 $V_4$  casing =  $0.162 \text{ gal/ft}$   
 $V_5$  casing =  $1.47 \text{ gal/ft}$

Initial height of water in casing 13.65 Volume 2.22 gallons  
 Total to be evacuated =  $3 \times$  Initial Volume 6.67 gallons

Stop Time	Start Time	Bailed	Pumped	Cum. Gal.
-----------	------------	--------	--------	-----------

Pumped or Bailed Dry? Yes ☒ No ☐ After \_\_\_\_\_ gallons Recovery Rate \_\_\_\_\_

Water color 2 Odor \_\_\_\_\_

Description of sediments or material in sample: \_\_\_\_\_

Additional Comments: \_\_\_\_\_

## CHEMICAL DATA

Reading No.	1	2	3	4	5	6	7
-------------	---	---	---	---	---	---	---

Time \_\_\_\_\_

Gallons \_\_\_\_\_

Temp. (degree F) 71.0 70.1 69.9

pH 7.24 7.12 7.17

EC (umhos/cm) 597 581 589

Special Conditions \_\_\_\_\_

## SAMPLES COLLECTED

Sample ID ml	Bottle/cap	Filtered (size, u)	Preservative (type)	Refrig. (R, NR)	Lab (Init)	Analysis Requested
--------------	------------	--------------------	---------------------	-----------------	------------	--------------------

Bottles: P = Polyethylene; Pp = Polypropylene; C or B = Clear/Brown Glass; O = Other (describe)  
 Cap Codes: Py = Polyseal; V = VOA/Teflon septa; M = Metal

10:35

# WATER SAMPLING DATA

Job Name SOMOMA HIGHWAY Job Number 98-517-14  
 Well Number MW-3 Date 10/14/05 Time \_\_\_\_\_  
 Well Diameter 2" Well Depth (spec.) \_\_\_\_\_ Well Depth (sounded) 39.40  
 Depth to Water (static) 20.39 TOC elev. \_\_\_\_\_  
 G.W. Elev. \_\_\_\_\_ Maximum Drawdown Limit (if applicable) \_\_\_\_\_

Initial height of water in casing 19.01 Volume 3.09 gallons  
 Total to be evacuated = 3 x Initial Volume 9.29 gallons

**Formulas/Conversions**  
 $r$  = well radius in ft  
 $h$  = ht of water col. in ft  
 $vol. in cy. = \pi r^2 h$   
 $7.48 gal/ft^3$   
 $V_1$  casing = 12.163 gal/ft  
 $V_2$  casing = 12.367 gal/ft  
 $V_3$  casing = 12.653 gal/ft  
 $V_4$  casing = 12.426 gal/ft  
 $V_5$  casing = 1.47 gal/ft

Stop Time	Start Time	Bailed	Pumped	Cum. Gal.
-----------	------------	--------	--------	-----------

Pumped or Bailed Dry? Yes ☒ No After \_\_\_\_\_ gallons Recovery Rate \_\_\_\_\_

Water color \_\_\_\_\_ Odor \_\_\_\_\_

Description of sediments or material in sample: \_\_\_\_\_

Additional Comments: \_\_\_\_\_

## CHEMICAL DATA

Reading No.	1	2	3	4	5	6	7
Time							
Gallons							
Temp. (degree F)	<u>69.4</u>	<u>69.0</u>	<u>68.9</u>				
pH	<u>7.04</u>	<u>7.00</u>	<u>7.08</u>				
EC (umhos/cm)	<u>496</u>	<u>469</u>	<u>432</u>				
Special Conditions							

## SAMPLES COLLECTED

Sample ID ml	Bottle/cap	Filtered (size, u)	Preservative (type)	Refrig. (R, NR)	Lab (Int)	Analysis Requested
--------------	------------	--------------------	---------------------	-----------------	-----------	--------------------

Bottles: P = Polyethylene; Pp = Polypropylene; C or B = Clear/Brown Glass; O = Other (describe)  
 Cap Codes: Py = Polyseal; V = VOA/Teflon septa; M = Metal

10/15

## **APPENDIX E**

### **ECM STANDARD OPERATING PROCEDURE**

## **ECM STANDARD OPERATING PROCEDURE**

### **GROUND WATER SAMPLING**

The following describes sampling procedures used by ECM field personnel to collect and handle ground water samples. Before samples are collected, careful consideration is given to the type of analysis to be performed so that precautions are taken to prevent loss of volatile components or contamination of the sample, and to preserve the sample for subsequent analysis. Wells will be sampled no less than 24 hours after well development. Collection methods specific to ground water sampling are presented below.

Prior to sampling, each well is purged of a minimum of three well casing volumes of water using a steam-cleaned PVC bailer, or a pre-cleaned pump. Temperature, pH and electrical conductivity are measured at least three times during purging. Purging is continued until these parameters have stabilized (i.e., changes in temperature, pH or conductivity do not exceed 10%).

Ground water samples are collected from the wells/borings with steam-cleaned or disposable Teflon bailers. The water samples are decanted into the appropriate container for the analysis to be performed. Pre-preserved sample containers may be used or the analytic laboratory may add preservative to the sample upon arrival. Duplicate samples are collected from each well as a back-up sample and/or to provide quality control. The samples are labeled to include the project number, sample ID, date, preservative, and the field person's initials. The samples are placed in polyethylene bags and in an ice chest (maintained at 4°C with blue ice or ice) for transport under chain-of-custody to the laboratory.

The chain-of-custody form includes the project number, analysis requested, sample ID, date analysis and the ECM field person's name. The form is signed and dated (with the transfer time) by each person who yields or receives the samples beginning with the field personnel and ending with the laboratory personnel.